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Enhancing Critical Sustainability in the Design Studio: An Action Research Project

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Abstract

Sustainability is a complex and contestable field. The architectural design studio typically frames sustainable design as a technical, performance orientated exercise, often at the expense of contextualised responses which address the conflicting needs of a range of stakeholders. Sustainability is often viewed at odds with “design”, in part driven by teaching structures which outsource sustainability to satellite units, elective modules or specialist consultants.

This paper describes an action research project to enhance integration of sustainability into the architectural design studio. It took place over an academic semester on an MArch course at a leading UK institution. The researcher staged a series of interventions into the design studio through workshops, lectures and tutorials. A cyclical reflective process informed the structure of these sessions led to the development of a model to encourage critical responses to sustainable design.

The findings show that while the workshops were deemed valuable in isolation, developing effective long-term learning for sustainability which enhanced individual design practices was more challenging. Some students were able to adapt the content and methodology of the workshops and integrate this into their own design process. Others, however, struggled to relate the sessions to their studio work without regular input. There were also differences in how students integrated the knowledge created through the workshops; some saw it as a means to clarify conceptual strategies while others used it as an analytical tool.

This research concludes that although the interventions enhanced learning, their effect was limited by the implicit agenda and expectations of the design studio. Framing design as an autonomous activity which is independent, or contradictory, to sustainability was prevalent in the design studio, acting as a significant barrier to change. This paper also presents the resultant model for critical analysis of sustainable design. The findings have significance for architectural pedagogy and the nature of teaching interactions. Structured

learning through facilitated workshops and seminars, embedded within the studio, may offer legitimate alternatives to the more common desk-top tutorial and “crit”.

1. Introduction

Sustainability is a complex and contestable field. The architectural design studio typically frames sustainable design as a technical, performance orientated exercise, often at the expense of contextualised responses which address the conflicting needs of a range of stakeholders (Ramirez, 2004). Sustainability is often viewed at odds with “design”, and educators often struggle to motivate students to actively engage with sustainable design (EDUCATE, 2012).

This research aimed to enhance student sustainable practices within the architectural design studio. It sought to encourage *deep learning* through integrating a structured model of sustainable design into the design studio. It aimed to empower participants with the capabilities to question and challenge assumed sustainable knowledge. The research adopted an Action Research methodology (AR). A series of interventions into the design studio were made to explore the potential impact of the model on student learning and design practice.

2. Background

2.1 Deep learning for sustainable design

Integrating sustainability into education has been consistently linked to deep learning (Buckingham-Hatfield & Evans, 1996; Warburton, 2003) including in the field of architecture (Clune, 2014; EDUCATE, 2012). *Deep-level* learning was described by Marton and Säljö (1976b) and refers to a concern with underlying meaning and its principles. Deep learning is particularly relevant to educating for sustainability due to its interdisciplinary, interconnected and holistic nature (Buckingham-Hatfield & Evans, 1996). Beattie, Collins, and McInnes (1997) describe three primary characteristics of deep learning:

- (1) Seek to understand the issues and interact critically with the contents of particular teaching materials;
- (2) relate ideas to previous knowledge and experience and;
- (3) examine the logic of the arguments and relate the evidence presented to the conclusions. (p.3)

Case studies of sustainably themed studios are a common aspect of design education research. These have included expanding the range of human perspectives in the design studio (such as Alvarez and Rogers (2006) and Sieffert, Huygen, and Daudon (2014)); using structured design activities (such as Bala (2010), Lee (2014) and Sherman and Burns (2015)) and formal pseudo-experimental (such as Walker and Seymour (2008) and Gürel (2010)). An AR approach was used by Clune (2014) who introduced a range of interventions intended to enhance deep learning for sustainability.

2.2 Applying a model of sustainable design

This research examines the integration of a structured model for sustainable design into the design studio in order to enhance deep-learning for sustainability. The start point for this research was a model of sustainable design based on an analysis of UK architects (Grover, Emmitt, & Copping, 2018) which identified a range of contradictory responses to the sustainable challenge. This model was founded in earlier work in the social sciences which categorised paradigms of sustainable development (Dusch, Crilly, & Moultrie, 2010; Hopwood, Mellor, & O'Brien, 2005; O'Riordan, 1989) The model organises this information through perpendicular axes of attitudes to technology and attitudes to cooperation. The research identified that the majority of UK practice occupied a middle zone ranging from low-tech/participatory approaches to high-tech/authoritative ones.

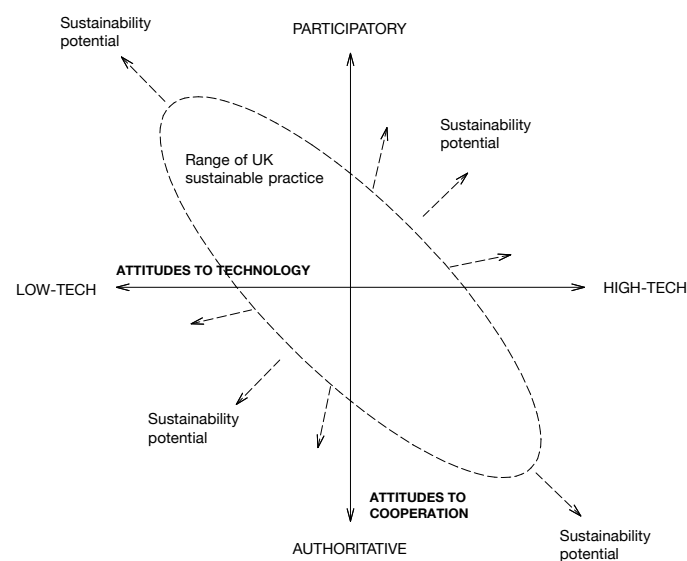


Figure 1: A model of UK sustainable architectural practice from Grover et al. (2018)

3 Methodology

The research took place at a leading UK university in the final year of an MArch RIBA 2 architecture programme. It was delivered directly in the design studio through a series of workshops administered *in situ*. The design studio was structured around a masterplan project for a foreign city of the students' choice, working in groups. The sample consisted students at the case study university (n=43). Workshops were conducted in 7 groups of between 5 and 7 students. All participants had similar levels of architectural education, all having completed an RIBA Part 1 course and the first year of an RIBA Part 2 course and all had at least one year's experience working in industry. Participants were aged between 21 and 30 with 21 male and 22 female students.

Data were collected through transcribed audio recording of workshops. Field notes of observations of tutorials and the project reviews were also taken. The researcher also observed the group's lectures and tutorials with staff. Semi-structured student interviews were also conducted at the end of the cycles. Using the cyclical process defined by Zuber-Skerritt (1996) and Cohen, Manion, and Morrison (2000). At the end of each cycle, the data were analysed using NVivo (a computer programme for analysing qualitative data). Following the analysis process defined by Hinchey (2008) the data were unitised (coded), categorised, and findings formulated.

4. Cycle 1: Summary of actions and findings

Cycle 1 consisted of workshops administered in the design studio. The workshops utilised the sustainability model as a critical thinking tool through which students could map their own sustainability strategies. It emphasised an active learning process through which students could actively "construct knowledge". It was intended that each workshop follow a similar structure. Cycle 1 took the form of a 45 minute workshop delivered in seven groups of 5-7 participants taking place in the design studio.

The model was simple for students to understand which I was able to draw and explain its use simultaneously on a sheet of A1 paper. I described where the proposed strategies for each project might sit. The model was used to structure ideas revealing possible competing approaches. For example, in one case it exposed the contrast between embracing high-tech and low-tech, bottom-up approaches to development.

“A lot of the home-grown [businesses] there could be considered low-tech. There are plans for development in the area which are focusing more on smart tech.” (Student from group R)

Students were then able to synthesise the two approaches through citing an example they had come encountered where an app was enabling community engagement in local services. The model acted as a vehicle to prompt students to consider combining ideas about community engagement and high-technology.

The workshop was predominantly student led, often involving a lengthy description of the project. Participants would often have set questions which they required “answered” or in some cases were looking for specific guidance. In most cases the identification and explanation of issues dominated the workshops. The model was not integral to each session but was an addition which garnered a limited amount of conversation. Rather than eliciting deep student learning, use of the model required the tutor to heavily facilitate its use.

5. Cycle 2: actions and findings

The second cycle was instigated in the same manner of the first cycle, that is through a 45 minute tutorial session delivered directly in the design studio in six groups of 5-7 students. Students had well developed projects for critique. The structure of the workshops adopted a similar structure to the first cycle of describing sustainable strategies, mapping them to the model and discussing outcomes.

Students listed on post-it notes and I plotted these on the model, which was drawn in front of the group. In all cases, the listing of strategies emerged from student conversation, however I was required to apply these to the model, often with the students nodding in agreement. The students did not construct the model themselves in any instance, nor did they query the position of strategies on the model.



Figure 2: Constructing the model in a workshop

In half the workshops students referred directly to the constructed model. In these instances, it provided a clear visual representation of design strategies:

“For a presentation can we use the diagram like that but you’ve made?” (Student from group B)

By plotting individual strategies on the model, both participants and the researcher were able to visually identify strategic holes. One student suggested *“bridging the gap”* was required to link disparate strategies and that *“something more in the short term and more traditional bottom up stuff”* might help the group implement their long term goals. A second group used the model to realise that to *“list loads of technologies”* was inadequate and their design approach needed to *“permeate”* the scheme.

Students revealed how the sessions prompted a change in narrative approach for their group such as prompting recomposing of their ideas into a single coherent strategy:

“...after we had that meeting with you we could link all those things together and they could be solved through one system.” (Student EB)

In two of the workshops, groups used the discussion from the model to generate new ideas, realising where new strategies might enhance existing proposals.

In four of the six cases, students explicitly identified how the model had clarified proposals and linked disparate strategies. For example, one group recognised a tram network they were forming through their city was the common element across a number of sustainable strategies (figure 1).

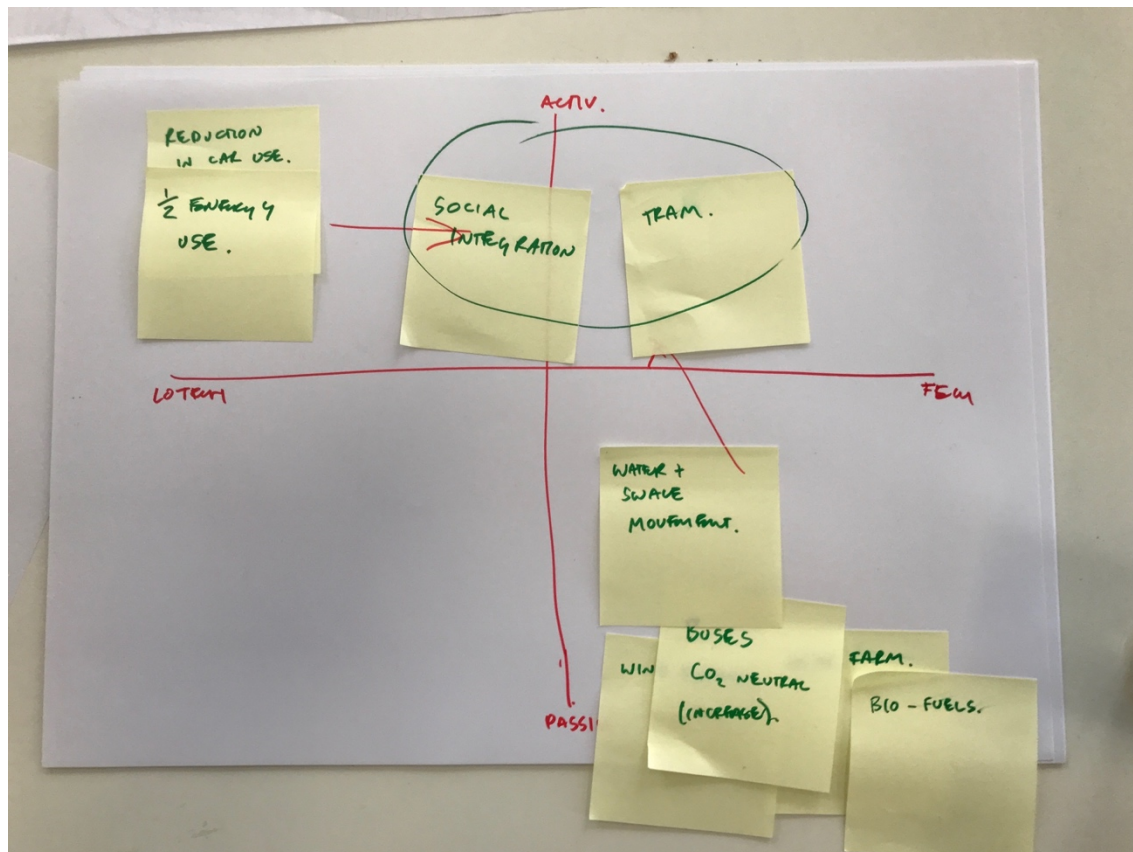


Figure 3: Example of mapping using post-its and the model. Ideas are plotted and linked through the introduction of an overarching infrastructural strategy (tram network).

There was mixed reaction to its impact on learning beyond the workshops. One student was almost ambivalent to its efficacy while another considered it valuable and effective but was unable to articulate their learning directly. Some were able to describe directly the impact of the model on their learning:

“I suddenly realised all these things came together so it was definitely a catalyst for the thing.” (Student EB)

8. Discussion

It became clear throughout the cycles that teaching method and the use of a critical thinking

“tool” were inherently linked. Interaction and engagement with the model was due to my own agency. There was clear evidence of restructuring of information to generate new design possibilities (Warburton, 2003), forming relationships between different parts (Smith & Colby, 2007) and enabling a more holistic understanding of sustainable design (Marton & Säljö) that was explicitly linked to design strategies.

Group seminar formats aided implementation as it allowed the co-production of knowledge and sharing experiences. It provided an alternative to traditional teaching environments. The structured nature of the workshops produced an illusion of “objectivity” which allowed students to critically evaluate design decisions. For some students, listing strategic approaches that they found the most valuable.

“We joked that the tutorial we had with you was the only useful one, our whole thing was about sustainability but yours is the only tutorial that was super focused on what the project was actually about.” (James)

Warburton (2003) contends that providing critical thinking tools to enable deep learning is an essential aspect of sustainable teaching however the findings suggest that provision of the tool alone is inadequate.

The masterplan project and its large scale and diagrammatic nature limited the influence of alternative design concerns. Sustainability was a prominent theme for design in a process which was liberated from issues of form, style and appearance allowing students to focus on wider strategic goals. This allowed sustainable strategies that dealt with numerous environmental and social issues through both technical solutions and participatory action. The model clearly facilitated a number of the characteristics associated with deep learning including the creative restructuring of information as well as its analysis (Warburton, 2003). Questioning assumptions of the system in which the learning take place (Argyris & Schon, 1974). While some students appreciated the more structured and objective tutorial format to question and analyse particular issues, there was limited evidence of questioning the place of architecture in the broader context of sustainability.

9. Conclusions

The conceptual model was shown to be a robust tool for critiquing and evaluating design solutions. When it was used most successfully, it was used to clarify ideas, restructure them and synthesise new proposals from the linkages that emerged, traits commonly associated

with deep learning. It was not observed to act as a standalone tool for ideation. Students were most engaged when specific strategies were mapped with my own facilitation.

Using an AR approach can be a valuable method for enhancing professional practice for educators. My experience made me question my own assumptions of what I considered “good” teaching in the studio. This process however has to be a personal and self-motivated one. Ultimately, the embedded assumptions, culture and expectations of the design studio limit the effectiveness of introducing new ways of working. Further work is planned which will be undertaken testing the model over another semester with the same students. Students will be working individual and on a building scale project.

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